MODEL HT-33A, MARK I

Linear Power Amplifier

the hallicrafters co.
4401 W. FIFTH AVENUE · CHICAGO 24, ILLINOIS

ERRATA SHEET
FOR
MODEL HT-33A, MARK I

Resistor R17 is listed on the schematic diagram as a 220 ohm, 2 watt resistor; change R17 to read 1000 ohms, 2 watts.

The following changes should be noted in the Service Parts List under the "Miscellaneous Chassis Parts" heading:

1. Change Part Number of fan blade to read 080-300583.
2. Add "Strap, Capacitor Clamp", 076-203078.

Pack with Instruction Manual
094-902095
Form Number 094-902255

Figure 1. Hallicrafters Model HT-33A, Mark I Linear Amplifier

SECTION I
GENERAL

1-1. GENERAL DESCRIPTION

The Hallicrafters Model HT-33A is a compact linear amplifier employing a Penta-Lab PL-172 pentode type tube having 1000 watts plate dissipation. The HT-33A is designed as the ideal companion unit for The Hallicrafters HT-32, HT-37, or FPM-200, and may be used with any 100 watt exciter without the need of an external pad or matching network.

The circuit employs a single PL-172, operating class AB1 or AB2. The input circuit is designed for either 50 or 75 ohm matching and requires no grid tuning or neutralization at any time. The power supply is completely self-contained and uses two 3B28 tubes connected in a full wave rectifier circuit having excellent regulation. Screen voltage is controlled by four OA2 regulator tubes. A variable bias supply with front panel control is included to maintain proper idling plate current. Provision has been made to apply cut off bias by proper connections to an octal plug on rear of chassis. 115 VAC is also available at this plug for switching operations.

Overload protection is provided by a 5 ampere fuse (F1) which protects the filament, bias, and blower circuits; a 1/16 ampere fuse (F2) which protects the PL-172 tube screen grid; and a 22 ampere circuit breaker, which, in addition to being the high voltage "ON-OFF" switch, protects the high voltage supply.

An interlock safety switch removes the primary voltage from the plate supply transformer when the cabinet cover is opened. (Do not attempt to defeat its purpose, as lethal voltages are present.)

1-2. T.V.I. (Television Interference) SUPPRESSION

Every consideration has been given to possible local TVI problems in the design of the HT-33A. Circuitry has been used that discourages harmonic generation. A low pass filter has been included in series with the AC power leads. The enclosed metal cabinet greatly aids in shielding. A ground lug has been provided at the rear of the chassis for an external ground connection. It is recommended that all station components be bonded together with heavy copper wire or strap and connected to an earth ground. Ground leads, which are equal to 1/4 wave length at your favorite operating frequencies, should be avoided.

1-3. ADDITIONAL FEATURES

Many additional features have been included for reliability and ease of operation. All important circuits are metered and easily read on a large illuminated meter. In addition to grid current, screen current, cathode current and plate voltage ranges, an RF output volt meter is included for easier tuning. In this position (keeping in mind the maximum current ratings for the tube as given later), both PLATE TUNING and PLATE LOADING controls are adjusted for maximum deflection on the voltmeter. A red jewel on the front panel indicates that the high voltage supply is on. All band switching is accomplished by a single selector knob.

SECTION II
INSTALLATION

2-1. UPACKING

Check all shipping tags and labels for further instructions before removing or destroying them. All tubes will be shipped in a separate carton to prevent damage to the tubes and sockets.

Remove the PL-172 tube from the carton and be sure the small metal cooling flag is firmly attached to the short center pin at the tube base. The tube must be oriented so that the large cathode pin is in line with the large hole in the socket. Lower the tube into the chimney carefully, rotating the tube slightly back and forth until the tube pins engage in the socket holes. DO NOT FORCE. As the tube engages the socket, press down lightly until firmly seated in the socket. After the tube is installed, loosen the screw at the point where the parasitic choke is connected to the coupling capacitor. Swing the parasitic choke and anode connector around to the proper position and snap the anode connector on to the plate of the PL-172 tube. Tighten the screw at the point where the parasitic choke connects to the coupling capacitor (FIRM, BUT WITHOUT FORCE). (See Figure 3 for exact location.) Install the four OA2 regulator tubes. Install the two 3B28 rectifier tubes, and connect rectifier plate caps.

2-2. LOCATION

It is very important that the HT-33A be placed in such a manner that complete air circulation will be had on all sides, the top, and the bottom. The air intake for the fan is through the bottom of the cabinet, and air space must be maintained. The HT-33A must rest on cabinet feet at all times. Under no circumstances should any object be placed on top of this unit.

2-3. POWER REQUIREMENTS

The HT-33A is designed for 117V, 50/60 cycle AC operation. The source should be capable of supplying 2350 watts with good regulation at the specified line voltage if the maximum capabilities of this unit are to be realized.

2-4. RACK MOUNTING

The HT-33A may be rack mounted if desired. In order to accomplish this, the unit must first be removed from the cabinet by following the procedure given below:

1. Remove the perforated bottom panel from the cabinet.
2. Remove the short AC fan cord from its receptacle.
3. Remove the three screws which hold the fan support bracket to the chassis.
4. Remove the fan assembly from the unit.
5. Remove the three chassis mounting screws at the bottom rear of the cabinet.
6. Remove the top and bottom screw on each side of the front panel (Four screws only).
7. Open the cabinet cover to disengage the interlock switch. (BE SURE ALL CABLES ARE DISCONNECTED FROM CHASSIS.)
8. Slide the chassis out from the front of the cabinet.
9. The fan must be replaced in its original position after the unit is installed in the rack. Never operate the unit without using the fan.

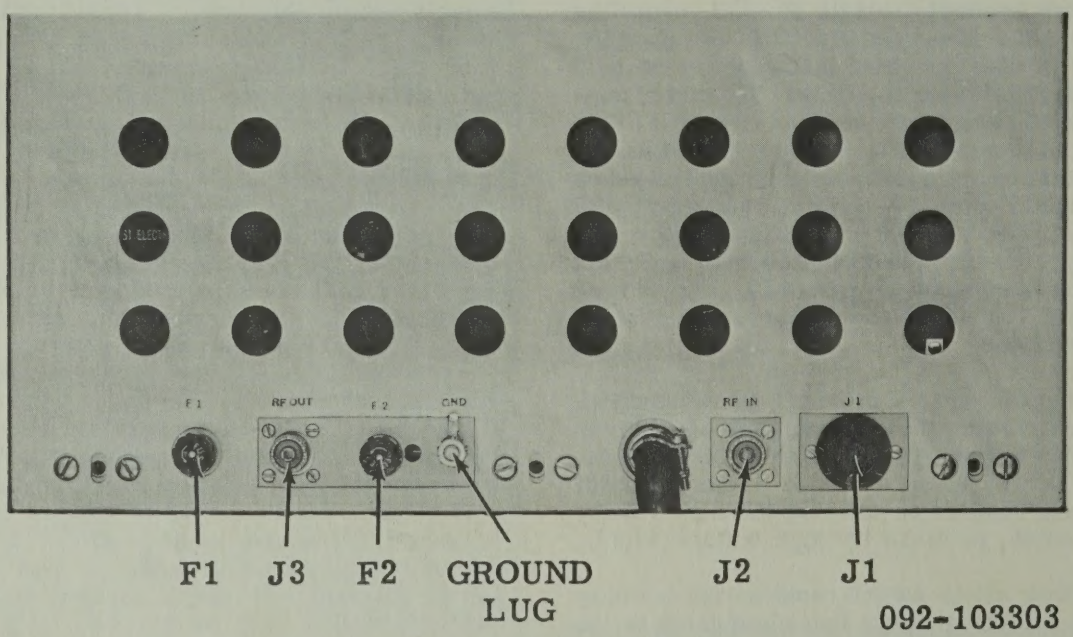

Figure 2. Rear View of Chassis

The slots at the edges of the front panel are properly spaced to accommodate mounting screws in a standard 19 inch rack.

NOTE

A chassis support shelf should be used in the rack. Never support the weight of the HT-33A from the front panel.

The HT-33A should never be placed directly above another unit that radiates heat, as the fan will blow this warm air through the tube and impair its cooling capabilities. Also, the area above the chassis must not be constricted, but should allow the warm air to be freely exhausted into the room.

2-5. BIAS AND ANTENNA RELAY CONNECTIONS

It is recommended that coaxial type antenna changeover relays be used with the HT-33A.

It is also recommended that cut off bias be used in all modes of operation. (See figures 4, 5, and 6 for antenna relay connections.)

NOTE

The bias control relay may be connected in parallel with any 117V AC antenna changeover relay.

The HT-33A is shipped with a jumper between pins 3 and 4, and another jumper between pins 1 and 8 in the plug at rear of chassis, marked J1. This allows the HT-33A bias relay to close when the "FILAMENT" switch is turned "ON". If either jumper is removed, the bias relay will remain open and cut-off bias will be applied to the PL-172 tube.

AC voltage (117V, not to exceed 50 watts) is available at this plug (J1) when the "FILAMENT" switch is turned "ON".

Another AC circuit is available (117V, not to exceed 50 watts) when the "HIGH VOLTAGE" switch is turned "ON".

2-6. RF INPUT AND OUTPUT CONNECTIONS

A. RF INPUT

The input connector (J2), located at the rear of the chassis, will mate with a type PL-259 coaxial connector (Amphenol type 83-1SP) (not supplied). Excitation from the exciter unit should be applied through this connector. The input is designed for 50 to 75 ohms and any reasonable length of RG-58/U cable will suffice.

CAUTION

Care must be used in applying excitation. See tuning instructions in Section IV.

B. RF OUTPUT

The output connector (J3), located at the rear of the chassis, will mate with a type PL-259 coaxial connector (Amphenol type 83-SP) (not supplied). Use only RG-8/U coaxial cable in the feed line. Although the output impedance is variable, it is strongly recommended that the load be 50 ohms with the lowest possible VSWR. Never attempt to feed an antenna of unknown characteristics, as serious damage to the HT-33A may result. For further information on this subject, consult the A.R.R.L. handbook.

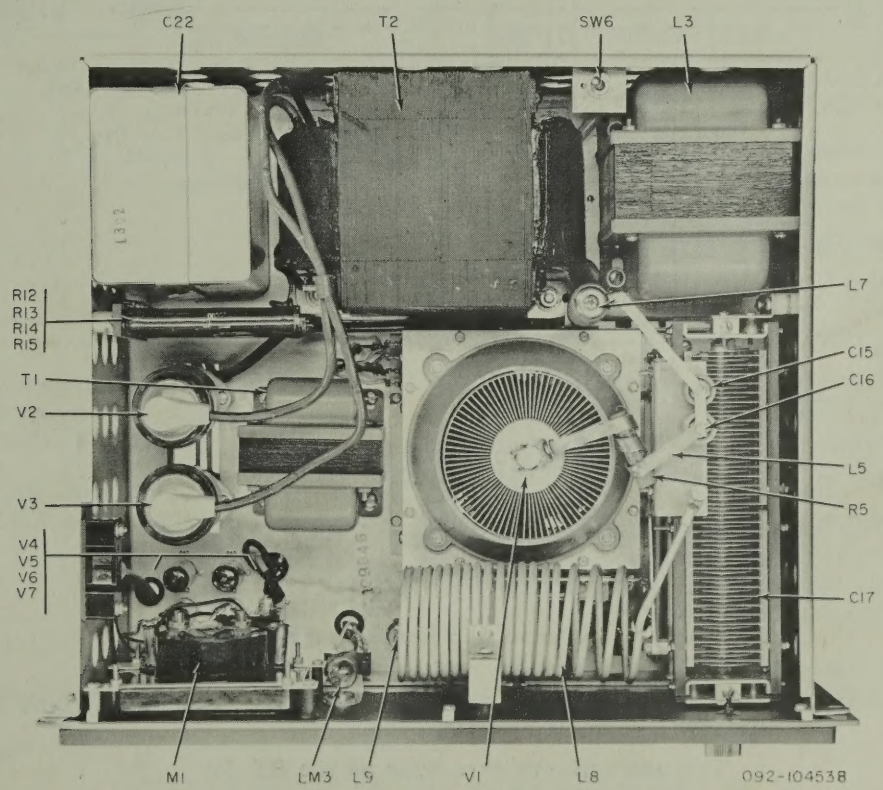

Figure 3. Top View of Chassis

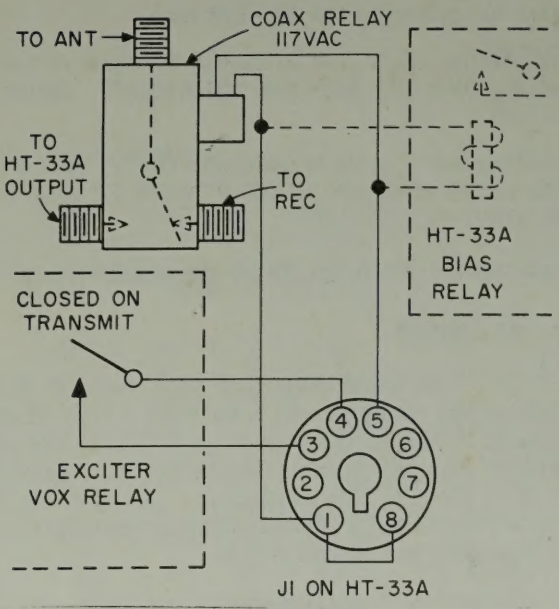

Figure 4. Antenna and Bias Switching Circuit

Suggested antenna and bias switching circuits where 117V AC is supplied by the HT-33A.

For use with exciters such as HT-32
(Note - Contacts used in exciter Vox relay must have no internal connections).

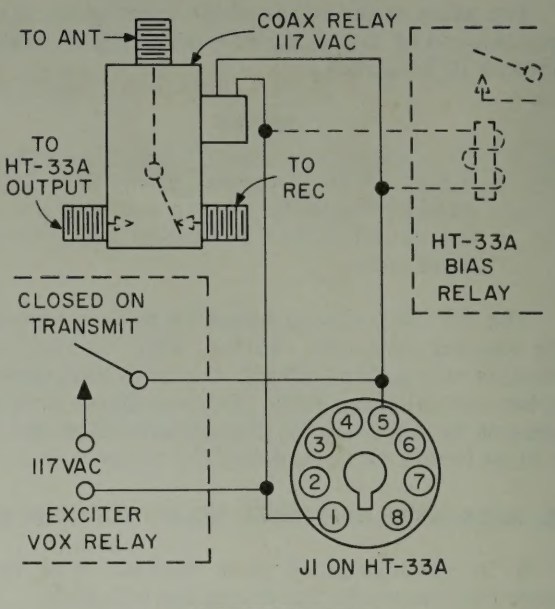

Figure 5. Antenna and Bias Switching Circuit

Suggested antenna and bias switching circuits where 117V AC is supplied through Vox relay contacts in exciter.

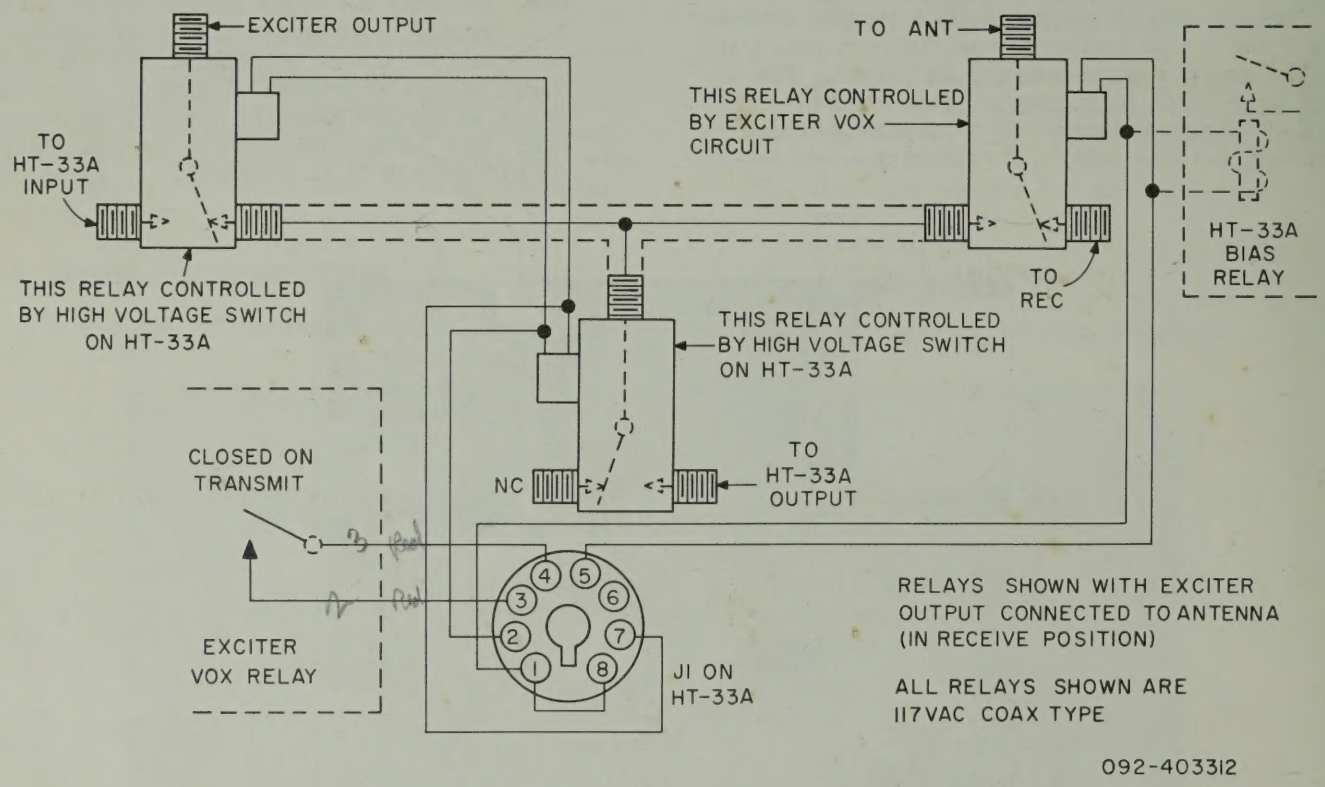

Figure 6. Antenna and Bias Switching Circuit

Suggested antenna and bias switching circuits where 117V AC is supplied by the HT-33A.

For use with exciters such as the HT-32.

Antenna switching from the HT-33A to the exciter will be automatic when the "High Voltage" Switch is turned "OFF".

SECTION III
FUNCTION OF OPERATING CONTROLS

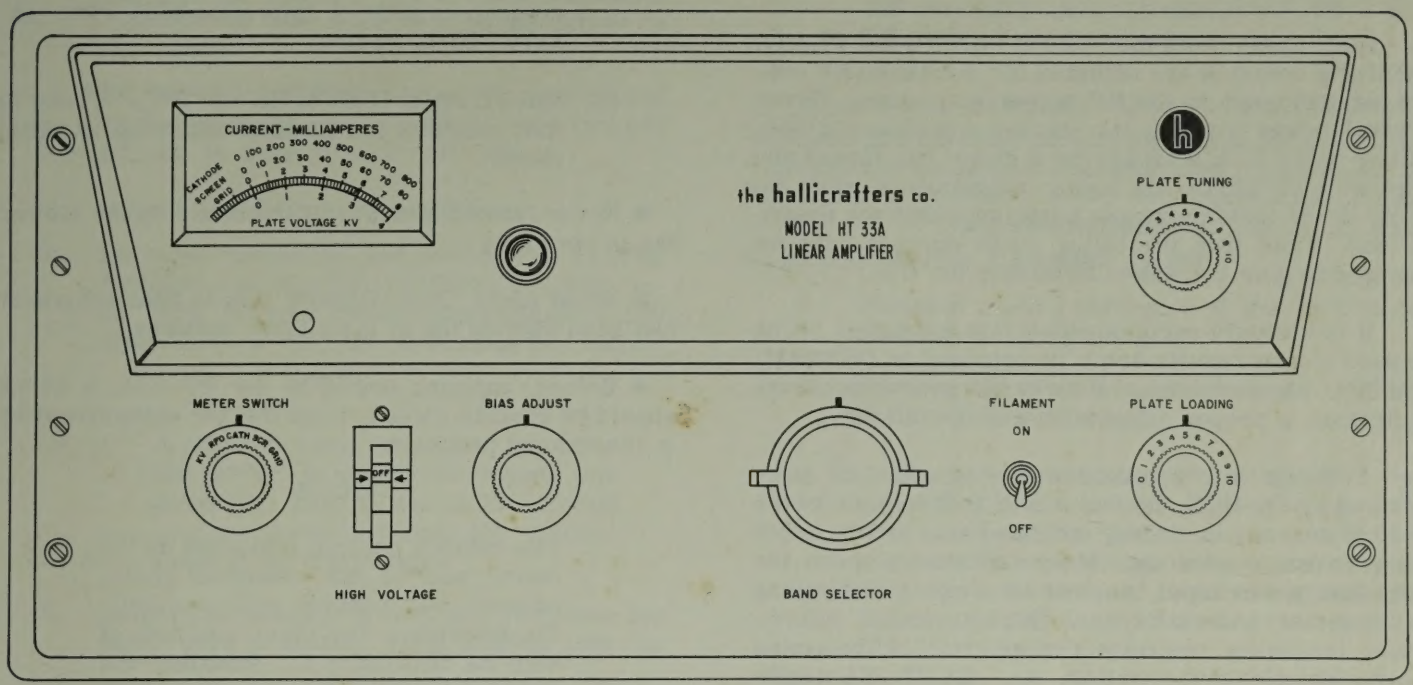

Figure 7. Front Panel Controls

NAME OF CONTROL	TYPE	DESCRIPTION
FILAMENT	Toggle	Connected in series with power line. Used to energize all filaments, bias supply, and fan, or to disable entire unit.
HIGH VOLTAGE	Circuit Breaker (22 Amp.)	Used to energize primary of high voltage transformer and turn on red indicator light. Also protects high voltage supply.
METER SWITCH	Rotary (5 position)	Connects the meter to read grid, screen, cathode current, RF output voltage, and plate voltage. The setting of the switch automatically switches in the correct shunt or divider network.
BIAS ADJUST	Potentiometer	Used to adjust the cathode current to the correct operating point.
BAND SELECTOR	Rotary Switch (5 position)	Selects proper plate tank coil tap. Shorts out unused portion of coil. Switches in additional loading capacity on 40 and 80 meters. Switches in additional stator section of Plate Tuning capacitor on 40 and 80 meters.
PLATE TUNING	* Variable Capacitor	Resonates plate circuit to operating frequency. (Never attempt to use the HT-33A as a frequency multiplier.) Note: One section used on 10, 15, and 20 meters, both sections used on 40 and 80 meters.
PLATE LOADING	* Variable Capacitor	Used to adjust output impedance to match the antenna load impedance. (40-80 Ohms.)

*Note: 0 on dial indicates maximum capacity and 10 indicates minimum capacity.

SECTION IV
OPERATING PROCEDURE

4-1. GENERAL .

In all cases, both the PLATE TUNING and PLATE LOADING controls are adjusted for maximum RF output as indicated on the RF output voltmeter. Never control power input by the loading adjustment alone. Power input should always be a direct function of the applied excitation. All tuning adjustments must be made at the maximum peak input level that you desire to use. Note that the idling plate current may be changed to give increased efficiency for CW.

It is strongly recommended that a monitor scope be used if best results are to be obtained on DSB (AM) and SSB. Meter readings alone cannot give an accurate indication of proper adjustment and operation.

Although a 1/4 second meter is used, as prescribed by the FCC, no meter will follow voice peaks and, of course, in no way indicates true power input under voice conditions. Many factors influence the indicated power input, such as the degree of damping in the meter, individual voice characteristics, microphone frequency response characteristics, response characteristics of the exciter, etc. All HT-33A amplifiers are factory checked on all bands at 1 KW average DC input on a two tone test signal. Under these conditions, the minimum peak envelope power output will be 800 watts with distortion products down at least 30 DB. Under conditions of voice operation, it is not unusual to realize output peaks in excess of 1 KW even though the cathode current, as indicated on the meter, does not reach 390 MA (1 KW average input).

Before attempting to operate the HT-33A, the following items should be checked:

1. All station components should be bonded together and to an earth or water pipe ground.
2. The HT-33A output jack (J3) should be connected to antenna transmission line through a coaxial type antenna changeover relay. (Never operate without antenna load).
3. The HT-33A input jack (J2) should be connected to exciter output.
4. HT-33A bias relay should be connected to exciter VOX circuit.
5. Check fan speed switch (See par. 6-8).

4-2. TUNING PROCEDURE

The following steps apply to all modes of operation.

1. Set FILAMENT SWITCH to "OFF".
2. Set HIGH VOLTAGE switch to "OFF".
3. Set METER SWITCH to "CATH" position.
4. Set BAND SELECTOR to desired band.
5. Plug the HT-33A line cord plug into a receptacle capable of delivering 2350 watts at 117V, 50/60 cycles.
6. Set FILAMENT SWITCH to "ON". Three to four minutes for filament warm up is sufficient.

- Never leave filament power on unless the blower fan is operating.

- Never apply "High Voltage" unless filament power has been applied for at least three minutes.

- Before applying power to the HT-33A, a check should be made to make certain that the relay circuitry is functioning properly.

NOTE

The cathode current indicated on the meter will be the combined plate, screen, and control grid current. To determine the plate current, it will be necessary to subtract the combined total of the screen current reading plus the control grid current reading from the cathode current.

4-3. CW OPERATION

1. Set the BIAS ADJUST control to the maximum counterclockwise position.
2. Assuming filament voltage has been applied for the required time, set HIGH VOLTAGE switch to "ON".
3. Set BIAS ADJUST control for 50-100 MA cathode current indication (without excitation).
4. Apply enough CW excitation from exciter to increase cathode current to approximately 150 MA.
5. Set METER SWITCH to "RFO" and adjust PLATE TUNING and PLATE LOADING for maximum upward deflection on the meter.
6. Set METER SWITCH back to "CATH" position and increase excitation until the cathode current reads approximately 300 MA.
7. Repeat step 5 of this procedure.
8. Increase excitation and adjust the PLATE TUNING and PLATE LOADING controls until plate current is approximately 370 MA. One kilowatt DC input will be had when the plate voltage multiplied by the plate current equals 1000. For an example: 2700V x 370 MA = 999 watts, or 999W ÷ 2700V = 370 MA.

Note that screen current and grid current have been subtracted at this point.

4-4. SSB OPERATION

1. Set BIAS ADJUST for 180 MA cathode current indication (without excitation). See par. 6-3.

2. Place exciter in "CW" position and increase excitation to the HT-33A until the cathode current reads approximately 250 MA.

3. Set METER SWITCH to "RFO" and adjust both the PLATE TUNING and PLATE LOADING controls for maximum upward deflection on the meter.

4. Set METER SWITCH to "CATH" position and again increase excitation until the cathode current is approximately 350 MA.

5. Repeat step 3 of this procedure.

6. Increase excitation and adjust the PLATE TUNING and PLATE LOADING controls until plate current reads approximately 520 MA. Always tune for maximum RF output.

NOTE

A slight buzzing sound may occur as the power is increased beyond one kilowatt. This is due to the circuit breaker operating near the critical point in its trip range.

7. Switch the exciter to SSB and increase the audio gain gradually while talking into the microphone. The drive level should not be increased beyond a point where the grid current exceeds 3 MA on the loudest voice peaks. As mentioned previously, the cathode current on voice peaks is dependent on several factors and may vary from approximately 250 - 370 MA under these conditions.

It should be remembered that the above instructions are of a general nature and are to be used only as a guide. To realize the maximum capabilities of the HT-33A on SSB or DSB, an oscilloscope should be used for the final adjustments.

4-5. DSB WITH CARRIER (AM)

1. Perform steps 1 through 6 of the SSB tuning procedure. See par. 4-4.

2. Remove CW excitation and place the exciter in the "AM" position.

3. Gradually increase AM output from the exciter until the HT-33A cathode current is 390 MA. With the exciter in "MOX" position, the cathode current will change very little with or without modulation. It is recommended that "voice control" be used for AM as well as SSB.

SECTION V
SERVICE DATA

5-1. SERVICE OR OPERATION QUESTIONS

For further information regarding operation or servicing of any Hallicrafters equipment, contact your Hallicrafters dealer. The Hallicrafters Company maintains an extensive system of Authorized Service Centers where any required service will be performed promptly and efficiently at a nominal charge. All Hallicrafters Authorized Service Centers display the sign shown below. For the location of the one nearest you, consult your dealer or telephone directory. Make no service shipments to the factory, as The Hallicrafters Company will not accept the responsibility for unauthorized shipments.

The Hallicrafters Company reserves the privilege of making revisions in current production of equipment and assumes no obligation to incorporate these revisions in earlier models.

5-2. WARNING - HIGH VOLTAGE

DC voltage in excess of 2700 volts is present in this equipment.

Do not attempt to measure voltages with hand held test leads or to service this unit with the high voltage supply on. In addition to the danger of serious injury or death from the high voltage supply, serious radio frequency burns can be caused by coming in contact with, or close proximity to, the plate and output circuits.

An AC interlock switch is installed on the cover for your protection. Do not attempt to defeat its purpose. Also, a bleeder circuit is provided to discharge the high voltage filter capacitor. However, we strongly recommend the use of a grounding rod to short the high voltage circuit to the chassis before any servicing is attempted.

USE EXTREME CAUTION WHEN WORKING WITH THIS EQUIPMENT.

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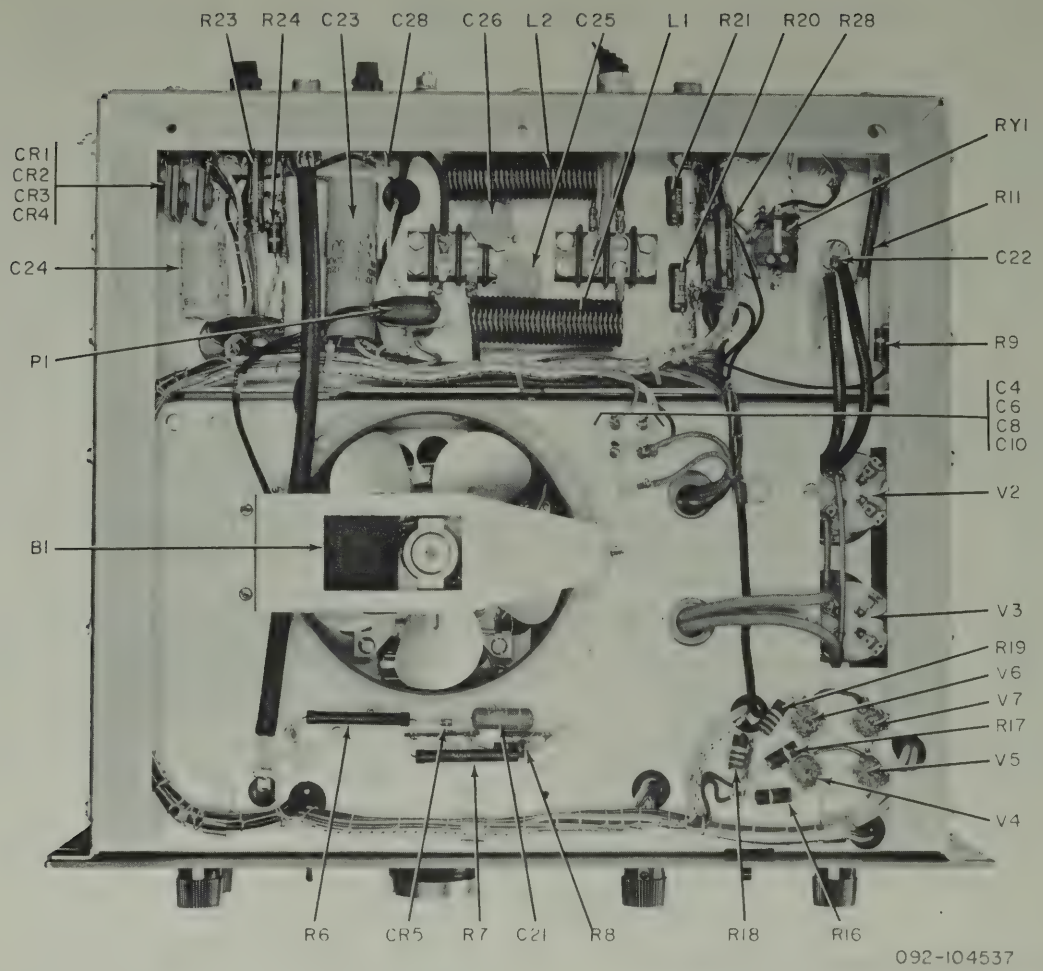

Figure 8. Bottom View of Chassis

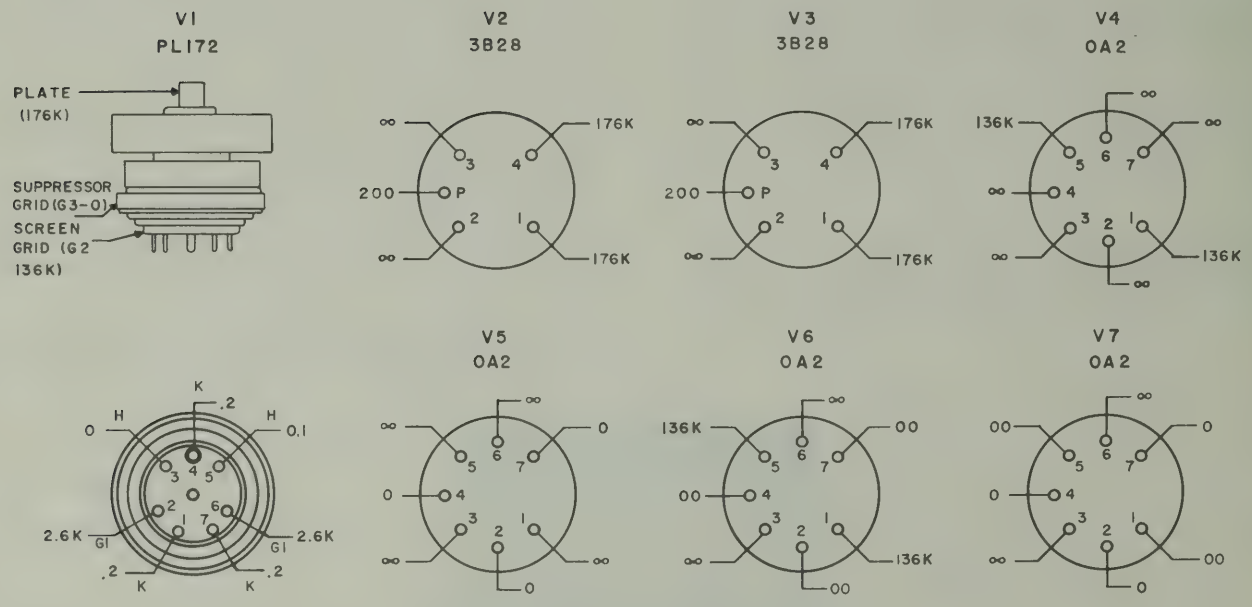

Figure 9. Resistance Chart

SECTION VI
GENERAL SPECIFICATIONS

Dimensions, Overall	20" W x 10 1/2" H x 17" D.
Dimensions, Front Panel	Standard Rack Mtg. 8 3/4" H x 19" W.
Mode of Operation	AB1 or AB2 linear power amplifier.
Power Consumption	2350 watts, 117 VAC, 50/60 cycles at maximum input.
Input Impedance	50 - 75 Ohms.
Output Impedance	40-80 Ohms.
Plate Power Input SSB	1000 watts average
Plate Power Input AM	1000 watts
Plate Power Input CW	1000 watts
Power Output SSB @ 1 KW Input	800 WPEP (Min.) Two tone test.
Drive Power SSB (180 MA Idling Plate Current)	50 WPEP
Drive Power AM (180 MA Idling Plate Current)	12.5 watts
Drive Power CW (50 MA Idling Plate Current)	60 watts
Weight, Net	114 pounds
Weight, Shipping	120.5 pounds

6-1. NEUTRALIZATION

No neutralization is necessary at any time. A low impedance input circuit, in conjunction with excellent shielding and by-passing, assures complete stability at all times.

6-2. GRID CURRENT

It is recommended that the grid current be kept below 5 MA for all modes of operation, and never be allowed to exceed 8 MA, except during very brief tune up periods.

It is normal for the PL-172 tube to exhibit a small amount of negative grid current. The grid meter scale has been calibrated to indicate up to 2.5 MA negative. Actually, tubes will perform satisfactorily up to several times this value.

NOTE

To prevent excessive grid dissipation, excitation should always be removed from the HT-33A before the HIGH VOLTAGE switch is set to "OFF".

6-3. IDLING PLATE CURRENT

CW - The idling current (plate current without excitation) may be set at 50 to 100 MA. Maximum efficiency will be realized when the idling current is approximately 50 MA. Less excitation will be required when the idling current is increased.

SSB - The idling plate current (plate current without excitation) may be set at any point between 180 MA and 220 MA. Maximum efficiency will be realized at 180 MA (AB2 operation); however, lowest distortion and lowest drive requirements will be realized with 220 MA idling current (class AB1 operation).

AM - The idling plate current (plate current without excitation) should be maintained at 180 MA (for Double Sideband with Carrier).

6-4. PLATE CURRENT

The indicated plate current on the 1/4 second meter will be approximately 370 MA for 1 KW plate input (legal limit for amateur use).

The plate current for 1 KW input (legal limit for amateur use) will be approximately 370 MA when the indicated cathode current is 390 MA.

The maximum plate current that may be drawn will be 500 MA (520 MA cathode current), and then, only during brief tune-up periods.

6-5. SCREEN CURRENT

The screen current will be approximately 10-15 MA at 1 KW input, SSB voice peaks. Under key down CW conditions, the screen current will be 20-25 MA at 1 KW input. The screen grid current should never exceed 40 MA.

6-6. PLATE VOLTAGE

The plate voltage should be approximately 2700 volts with 117V AC line voltage at 1 KW CW input.

6-7. RF OUTPUT VOLTMETER (RFO)

This voltmeter is connected across the output coax and indicates maximum output voltage across the coax. It is not calibrated, and is to be used as a tuning indicator (always tune for maximum upward deflection for a given power input). As this is not a peak reading meter, voice peaks will deflect meter approximately 1/3 the equivalent CW output.

6-8. TUBE COOLING (PL-172)

It is important that the cooling flag be installed on the short center pin at the base of the PL-172 tube. The flag is of the friction fit or self retaining type and need not be cemented or soldered. Should the PL-172 tube ever be replaced, the cooling flag should be transferred to the new tube.

The cooling fan in the HT-33A has provision for two speed operation. Under all normal operating conditions, adequate cooling for the PL-172 tube will be obtained with the fan in the "SLOW" position. Under extreme conditions of varying temperatures, and/or for prolonged periods of continuous key down input with full carrier, the fan switch should be placed in the "FAST" position.

The FAN switch is located on the chassis wrap around between the plate transformer and the filter choke, and is accessible by lifting the cabinet top cover.

6-9. CLEANING

Equipment that is power cooled may tend to collect dust within the unit, depending on the content of the air being circulated. Also, the 2700V circuitry has a tendency to attract dust particles. The circuitry should be kept clean, as any accumulation of dust in the high voltage or RF areas may cause arcing and consequent damage. This applies to both the top side and underside of the chassis. Both PLATE TUNING and PLATE LOADING capacitors should be cleaned frequently to prevent arcing between plates.

CAUTION

- Do not nick or bend capacitor plates.
- The preferred method of cleaning is by use of a vacuum cleaner while dusting with a clean flexible bristle brush. Be sure to remove and clean the fan and the area around the PL-172 tube socket.
- Never use solvents for cleaning.

6-10. LUBRICATION

Both upper and lower fan bearings should be lubricated with one or two drops of SAE #30 oil once a year.

6-11. CHASSIS REMOVAL

See RACK MOUNTING, par. 2-4.

SERVICE PARTS LIST

Schematic Symbol	Description	Hallicrafters Part Number
	CAPACITORS	
C1....	.005 mfd., 500V., 20%; Cer. Disc	047-100442
C2....	.001 mfd., 3KV., 20%; Cer. Disc	047-100397
C3,4,5,6,7,8,9,10	1500 mmf., 500V., Cer. Feed-Thru	047-100602
C11,12,13,28	.01 mfd., 500V., 20%; Cer. Disc	047-100354
C14...	.002 mfd., 600V., 20%; Cer. Disc	047-101085
C15,16.	1000 mmf., 5KV., 20%; Cer. Disc	047-200556
C17A,B.	Variable Capacitor, PLATE TUNING	048-300454
C18,19.	500 mmf., 5KV., Cer. H.V.	047-201084
C20....	Variable Capacitor, PLATE LOADING	048-100430
C21..	0.1 mfd., 200V, Paper	499-014104
C22...	10 mfd., 3KV., 10%; Paper	046-100889
C22 (Alternate)	8 mfd., 3KV.; Paper	046-200890
C23...	60 mfd., 450V., Electrolytic	045-100418
C25,26.	.01 mfd., 1400V.; Cer. Disc.	047-200752
C27...	200 mmf., 1KV., 10%; Cer. H.V.	047-201192
	RESISTORS	
R1,2,3.	200 ohm, 10W	023-100167
R4....	47 ohm, 1W (Part of L4)	----------
R5....	50 ohm, 5%, 10W, W.W. (Part of L5)	----------
R6....	47K ohm, 1%, 2W	452-003473
R7....	2.2K ohm, 1%, 2W	452-003222
R8....	4.7K ohm, 10%, 2W	451-652472
R9....	1.5K ohm, 5%, 2W	451-651152
R10 ..	1.5 megohm, 1%, 2W	452-003155

SERVICE PARTS LIST (CONT.)

Schematic Symbol	Description	Hallicrafters Part Number
	RESISTORS (CON'T)	
R11...	2 megohm, 1%, 2W	452-003205
R12, 13, 14, 15	10K ohm, 50W, W.W.	024-101232
R16, 17.	1K ohm, 10%, 2W	451-652102
R18, 19.	68K ohm, 10%, 2W	451-652683
R20...	1.5K ohm, 5%, W.W.	024-101234
R21...	1K ohm, 10%, 5W, W.W.	024-101300
R22...	1350 ohm, 4W; Variable, BIAS ADJUST	025-101734
R23...	2.5K ohm, 10W, W.W.	024-101235
R24...	47 ohm, 10%, 2W	451-652470
R25...	800 MA Shunt (Part of M1)	024-101305
R26...	8 MA Shunt (Part of M1)	024-101303
R27...	80 MA Shunt (Part of M1)	024-101304
R28...	60 ohm, 5%, 10W, W.W.	024-101292
	COILS AND TRANSFORMERS	
L1, 2..	Choke, AC Line	053-200512
L3....	Choke, Filter	056-200337
L4....	Choke, Parasitic Grid (Inc. R4)	053-100421
L5....	Choke, Parasitic Plate Assy. (Inc. R5)	041-250388
L6....	Choke, RF; 2.5 UH	053-200335
L7....	Choke, RF Plate	053-100508
L8....	Coil, Tank	051-402603
L9....	Choke, RF Safety	053-200444
T1....	Transformer, Rectifier Filament and Bias	052-300684
T2....	Transformer, Rectifier Plate	052-400685
	SWITCHES	
SW1 ..	Switch, Rotary; Meter	060-302008
SW2 ..	Switch, Toggle, DPST; FILAMENT	060-200908
SW3 ..	Switch, AC Interlock	060-200450
SW4 ..	Switch, Circuit Breaker	060-102096
SW5A, B	Switch, Rotary; BAND SELECTOR	060-302093
SW6 ..	Switch, Toggle, SPST; FAN	060-100138-02
	JACKS, PLUGS AND SOCKETS	
J1....	Socket, Octal; Antenna Relay	006-200296
	Plug, Octal	035-100003-01
J2, 3 .	Connector, Coaxial	010-100056
J4....	AC Receptacle (Fan)	010-200015
P1....	Line Cord and Plug; Fan	087-204833
P2....	Line Cord and Plug; AC	087-204978
.....	Cap, Rectifier Plate	076-100191
.....	Cap, PL-172 Plate (Part of L5)	----------
.....	Socket, Tube (V1)	006-200835
.....	Socket, Tube (V2, 3)	006-100316
.....	Socket, Tube (V4, 5, 6, 7)	006-100645
.....	Socket, Pilot Light (LM1, 2)	086-100031
.....	Socket, Pilot Light (With Jewel) (LM3)	086-200448
	KNOB AND KNOB SKIRTS ASSEMBLIES	
.....	Knob, BAND SELECTOR	015-101430
.....	Knob, PLATE TUNING and PLATE LOADING	015-101423
.....	Knob, METER SWITCH	015-101422
.....	Knob, BIAS ADJUST	015-101421
	TUBES, LAMPS, RECTIFIERS AND DIODES	
V1....	PL-172; Power Amplifier	090-201295
V2, 3 .	3B28; H.V. Rectifiers	090-900414
V4, 5, 6, 7	OA2; Voltage Regulators	090-900001
LM1, 2	Pilot Light	039-100003
LM3 ..	Pilot Light (117V)	039-200002
CR1, 2, 3, 4	Rectifier, Selenium (65MA)	027-100243
CR5 ..	Diode, 1N34A	112-100028
	MISCELLANEOUS CHASSIS PARTS	
.....	Barrier Strip	088-101959
.....	Blade, Fan	080-100583
.....	Bracket, Meter Mtg.	067-204619
.....	Bracket, Motor Mtg.	067-206544
.....	Cabinet	066-402251
.....	Chimney	008-205294
.....	Connector Hood	010-200055
.....	Cover, Cabinet Top	066-401487
.....	Feet, Rubber Mtg.	016-100029
F1 ...	Fuse (5 Amp, 250V)	039-100460
F2 ...	Fuse (1/16 Amp)	039-100504
.....	Fuse Holder	006-200837
M1...	Meter	082-400400
B1...	Motor, Fan	020-200218
.....	Panel, Front	068-400899

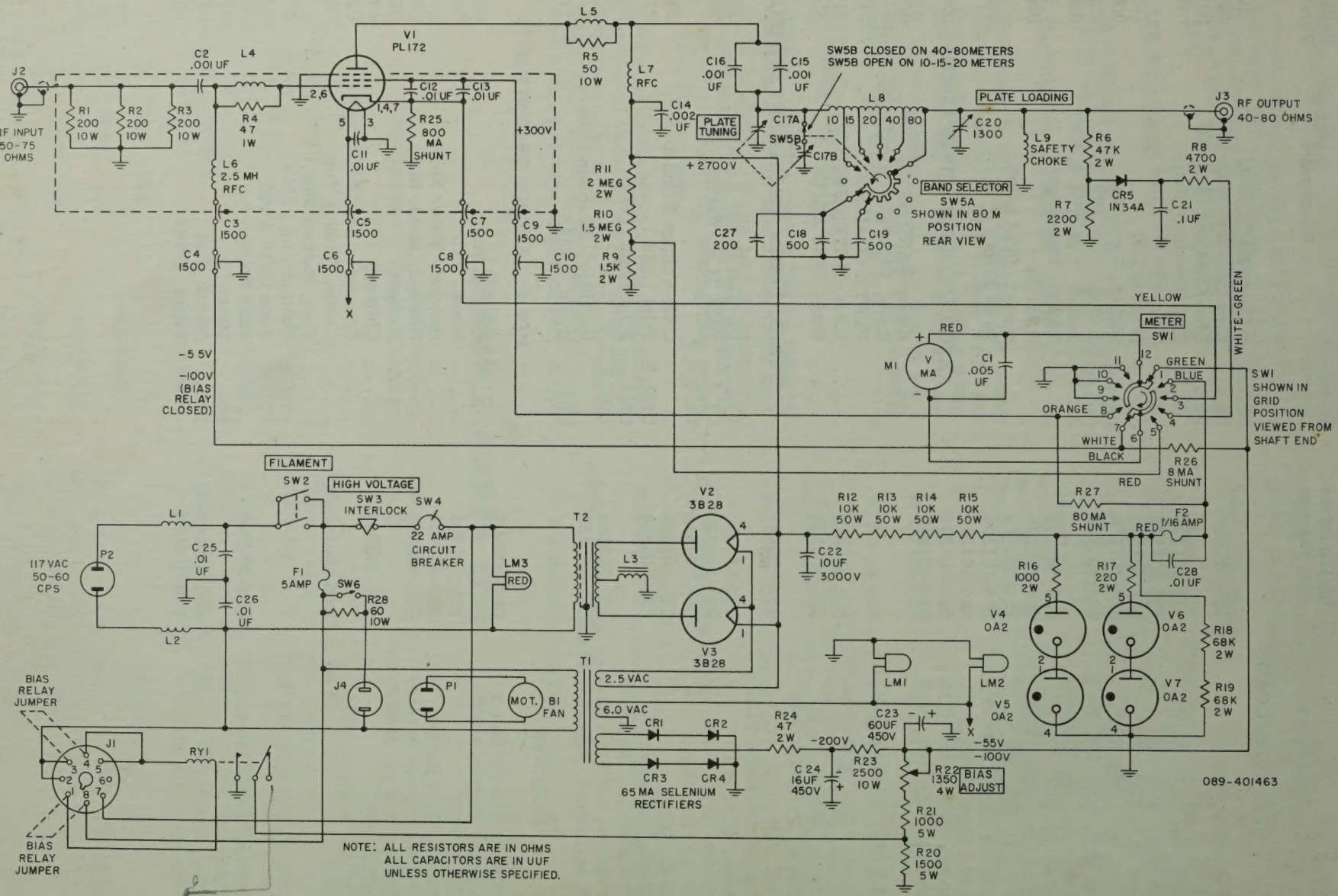

Figure 10. Schematic Diagram for HT-33A, Mark I Linear Power Amplifier

Warranty

"The Hallicrafter's Company warrants each new radio product manufactured by it to be free from defective material and workmanship and agrees to remedy any such defect or to furnish a new part in exchange for any part of any unit of its manufacture which under normal installation, use and service discloses such defect, provided the unit is delivered by the owner to our authorized radio dealer, wholesaler, from whom purchased, or, authorized service center, intact, for examination, with all transportation charges prepaid within ninety days from the date of sale to original purchaser and provided that such examination discloses in our judgment that it is thus defective.

This warranty does not extend to any of our radio products which have been subjected to misuse, neglect, accident, incorrect wiring not our own, improper installation, or to use in violation of instructions furnished by us, nor extend to units which have been repaired or altered outside of our factory or authorized service center, nor to cases where the serial number thereof has been removed, defaced or changed, nor to accessories used therewith not of our own manufacture.

Any part of a unit approved for remedy or exchange hereunder will be remedied or exchanged by the authorized radio dealer or wholesaler without charge to the owner.

This warranty is in lieu of all other warranties expressed or implied and no representative or person is authorized to assume for us any other liability in connection with the sale of our radio products."

Form No. 94X622

the Hallicrafters co.